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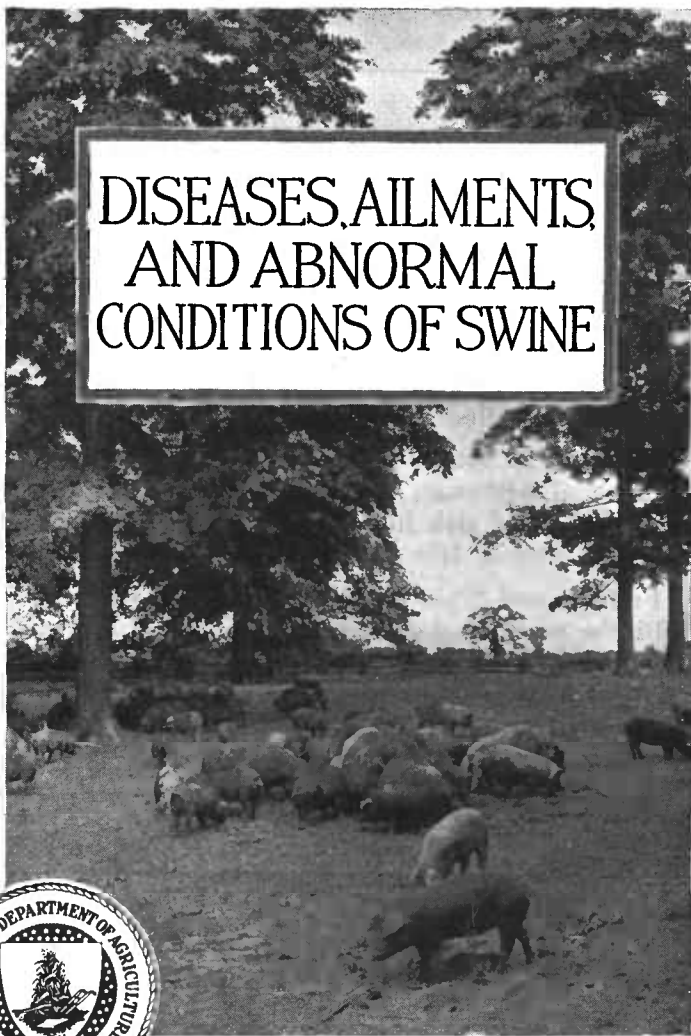
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U. S. DEPARTMENT OF AGRICULTURE

FARMERS' BULLETIN No. 1244

DISEASES, AILMENTS, AND ABNORMAL CONDITIONS OF SWINE



IN MANY SECTIONS of the swine-raising States it is still customary, although a violation of the law, to attempt the shipping of diseased hogs to market instead of giving the ailing herd proper attention and treatment.

In numerous cases such hogs are affected with some contagious disease and not only succumb in shipment but spread the infection to others with disastrous results.

It would be much safer for the livestock industry in general, although, perhaps, less profitable to the owner, to hold sick hogs on the farm till they have received proper treatment and are fully recovered.

Federal and State regulations are intended to prohibit the moving of diseased swine from one point to another, and do much toward reducing the number of dead hogs reaching the market, and to lessen the dissemination of swine diseases.

DISEASES, AILMENTS, AND ABNORMAL CONDITIONS OF SWINE.

By T. P. WHITE,

Assistant Chief, Division of Hog-Cholera Control, Bureau of Animal Industry.

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IMPORTANT INFECTIOUS DISEASES.

DISEASES AND CONDITIONS RESEMBLING HOG CHOLERA.

WITH THE DIMINUTION of hog cholera, the attention of farmers and swine breeders is called to more or less serious ailments of swine which, in time of unusual prevalence of hog cholera, go unnoticed or possibly are diagnosed as cholera itself. The group includes anthrax, epilepsy, gastroenteritis, necrobacillosis, pleurisy, pneumonia, poisoning, swine plague (hemorrhagic septicemia), tuberculosis, and worms. Other diseases not similar in appearance to hog cholera are either not recognized or are not deemed of sufficient importance to require attention. Any deviation from the normal in the functions of an animal, such as gait, appetite, or digestion, deserves the closest watching in order that measures may be taken to prevent serious results and possible losses. While some minor ailments of swine might be treated successfully by the owners, it is always well, in case of doubt, to call for more experienced service.

The owner of hogs is interested in having his herd free from disease. The healthier the animals the quicker they will finish for market. In a large number of cases sickness and unthriftiness are due, directly or indirectly, to improper care in housing, feeding, and at farrowing time. Even under the best conditions hogs are liable

to sicken, and in all circumstances of that character there is need of correct diagnosis in order that effective treatment may be given. Many factors are to be considered in distinguishing between hog cholera and the various other ailments and conditions that resemble that disease.

HOG CHOLERA.

Hog cholera is still the most serious of swine diseases. For many years the swine industry has been hampered and retarded in growth by the ravages of the disease and in some sections entire herds were destroyed. The reappearance of cholera year after year, with practically no known methods of protection, lent a discouraging aspect to the raising of swine. The losses in a single year from cholera have been computed as high as \$73,000,000, and for many years it was estimated at \$40,000,000 annually.

Though years have been spent in the study of hog cholera there are yet many factors responsible for the spread of the infection that are not known or fully understood. As a result of experiments a



FIG. 1.—Pigs in advanced stage of hog cholera.

serum was developed by the United States Department of Agriculture which protects hogs against cholera. The general adoption and use of this immunizing agent have created a feeling of security among swine growers and the result has been an increase in the production of hogs. Incidentally, it has stimulated the raising of cattle, since this phase of farming can be engaged in on a more profitable basis by having healthy herds of hogs follow the cattle.

Although losses from hog cholera have been reduced over 60 per cent from the peak years of destruction, the lack of attention on the part of farmers in the proper care of swine herds still occasions a serious monetary loss each year to the swine industry as a whole.

Symptoms.—Hog cholera is characterized by complete loss of appetite, extremely high temperature, constipation usually followed by diarrhea, chills, depression, burrowing in litter, ears and tail drooping, and sometimes cough. (See Fig. 1.) Red spots or blotches appear on the skin of the belly, inner side of the hams, and on the ears. In the advanced stages there is a staggering gait, and a gummy discharge from the eyelids often glues the eyes shut. All of these symptoms, however, may not appear in each individual hog affected.

Lesions.—On autopsy some or all of the following lesions may be noted: Hemorrhages (small, dark-red spots) showing through the capsule of the kidneys, bright-red blotches on the surface of the lungs and the outer covering of the intestines. The lymphatic glands are congested and enlarged, those most easily observed being located at the angle of the lower jaw, in the flanks, and in the fat of the intestines. Small, red blotches may be also found on the inner lining of the bladder and on the heart. In the advanced or chronic stage large buttonlike ulcers may be seen on the mucous membrane (inner lining) of the large intestines near the point where the large and small intestines join.

Treatment and prevention.—There is no reliable treatment for a hog visibly sick with hog cholera. Owing to the sudden onset and the rapid spread of the disease, swine herds should be constantly protected against the danger of infection. Cleanliness in the hog lot, the pen, and the shelter is absolutely necessary for the welfare of



FIG. 2.—Good type of individual hog houses.

the herd. Proper housing (as in Fig. 2), disinfection of quarters from time to time, keeping the animals within well-fenced lots to protect against infection carriers, and care in feeding will do much toward keeping the herd free from disease. In case a herd is attacked by cholera prompt attention is essential to prevent heavy losses. The serum treatment should be administered as soon as the disease is recognized or preferably when there is reason to suspect that the animals have been exposed to the infection. If any of the hogs have died, the carcasses should be burned or buried. After the sick ones have recovered and no further spread of the disease is noted, all quarters to which the animals have had access should be cleaned and disinfected.

The serum treatment for hog cholera is primarily an immunizing agent against the disease, though when used in the early stages it seems, in some cases, to have a curative effect. Many laymen are attempting to treat hogs for cholera without being able to recognize

one swine disease from another. Many minor ailments are often mistaken for cholera, and serum is used when cholera is not present, ending in bad results and the waste of the serum. If cholera is suspected, it is always best to call a trained veterinarian.

For further details concerning this disease and its prevention see Farmers' Bulletin 834, Hog Cholera.

SWINE PLAGUE (Hemorrhagic Septicemia).

Swine plague is essentially a type of swine pneumonia, but is not a herd disease. It attacks individuals only, in the herd as a rule. It is now generally agreed that swine plague and hemorrhagic septicemia in swine are the same.

Cause.—Swine plague is caused by a specific organism, *Pasteurella suisepitica*. This germ is found in the respiratory tract of many healthy hogs, but is apparently harmless until the vitality of the hog is lowered through disease or other factors. This accounts, perhaps, for the fact that swine plague is often found in connection with hog cholera. The devitalizing effects of cholera on the animal create a condition under which the disease organism becomes active resulting in the developing of swine plague. In such cases it is practically impossible to differentiate between the two diseases. Even with a post-mortem examination it is quite difficult to establish a line of demarcation between hog cholera and swine plague when occurring in the same animal at the same time.

Treatment.—When swine plague appears as a complication of hog cholera the case should be handled and treated as one of hog cholera, as the latter disease is by far the more fatal. The treatment for an uncomplicated case of swine plague is largely hygienic. Remove the sick hogs to comfortable, dry, clean quarters, provide plenty of fresh air and clean drinking water. Restrict the feed for a few days.

Hemorrhagic septicemia bacterins and hemorrhagic septicemia serums are on the market and have been used more or less extensively, but the treatment of this disease with such products is still in the experimental stage.

TUBERCULOSIS.

Tuberculosis is an infectious disease common to both domestic animals and man. It is slow in its development and is hard to recognize until the later stages, except through the application of the tuberculin test. In hogs tuberculosis is not likely to be mistaken for hog cholera unless the disease (tuberculosis) has progressed to an advanced stage.

Symptoms.—Tuberculosis, though it may have existed in a herd for a considerable period, is difficult to detect by clinical examination. There is rarely any elevation of temperature. The appetite, as a rule, is not impaired in the early stages of the disease. Later, however, the hogs affected lose their appetite, and this, coupled with the wasting nature of the disease, causes the animals to become weak and emaciated. If the lungs are involved, there is frequent coughing, while lesions of the intestines may produce more or less diarrhea. In advanced cases the temperature is sometimes below normal, and the

ailment then somewhat resembles chronic hog cholera. However, there is no congestion of the visible mucous membranes and no gummy exudate from the eyelids. While the animals are slow in moving about, there is not the staggering gait seen in chronic cholera.

Autopsy.—On examination of the dead animal there will be found in the lungs whitish-gray nodules varying in size from a pea to a walnut, and even larger. These nodules have a yellowish cheeselike center. Similar lesions may also appear in the liver and the spleen (melt). Sometimes these nodules may consist of a fibrinous material and contain a cheesy or granular substance. The lymphatic glands of the body, especially those located at the angle of the lower jaw, those between the lungs, and those in the fat of the intestines, are usually involved. Tuberculosis causes the inner portion of these glands to turn to a cheesy consistency, yellowish-white in color, which in the advanced stage of the disease may assume a gritty condition somewhat resembling grains of sand, very noticeable when cutting through them with a knife. In generalized cases of tuberculosis the lungs may be filled with multiple tuberculous abscesses and those organs may adhere to the ribs. The multiple abscesses are sometimes seen covering the entire pleura on one or both sides.

The extent of tuberculosis among swine in the United States is indicated in the annual reports of the Bureau of Animal Industry, United States Department of Agriculture. During a seven-year period, beginning in 1914, there were found at slaughtering establishments where Federal inspection was maintained over 3,500,000, or an average of 500,000 hogs each year affected with tuberculosis. These hogs were shipped from practically all parts of the country, and show that there are but few sections free from the disease.

Treatment.—Prevention is the main thought in the fight against tuberculosis. Since hogs usually contract the disease through feeding on skim milk from tuberculous cows or in following tuberculous cattle in the feed lot, there is no better preventive measure than to have a tuberculous-free herd of cattle. All skim milk fed should be heated sufficiently (145° F. for 30 minutes) to kill the germs of tuberculosis.

The tuberculin test is being used successfully in detecting tuberculosis in swine, the intradermic test being preferable. The reactors should be segregated and handled according to official agreement, if such exists. If the animals are marketed for slaughter, they should be shipped under proper regulations to a slaughterhouse where slaughtering is done under the supervision of Federal inspectors. Hogs known to be affected with tuberculosis should not be sold to local butchers.

HOG "FLU" (Swine Influenza, Infectious Bronchitis).

Hog "flu" or swine influenza, sometimes referred to as infectious bronchitis, is a disease of swine which appears widespread, particularly in sections where hogs are raised in large numbers. It is a herd disease attacking a large per cent of the animals at the same time. The thrifty, growing hogs seem to be more susceptible than the poorly fed and unthrifty ones.

Cause.—The causative agent of flu is unknown. While a sudden change of feed, such as from pasture to a heavy ration rich in pro-

tein, has been attributed as a factor, a study of the disease has failed to substantiate this theory.

Symptoms.—Swine flu is characterized by the sudden prostration of a large portion of the herd. There is complete loss of appetite. Spasmodic breathing, or thumps, is one of the first symptoms noted. When urged to move, the animals have violent fits of coughing. The eyes are red, swollen, and weeping. There may be a discharge from the nose, often streaked with blood. Occasionally a hog will vomit stringy mucus tinged with bile. The temperature in typical outbreaks ranges from 104° F. to 108° F. and usually drops to 103° F. to 104° F. in about a week, when, if the hogs survive, they are usually back on feed.

Treatment.—The treatment for swine flu is almost entirely hygienic. Place the animals in warm, clean, well-bedded quarters, with plenty of fresh air, and provide plenty of fresh drinking water. Give little feed or none at all for 24 hours.

INFECTIOUS ARTHRITIS (Joint Ill, Navel Ill).

Cause.—Infectious arthritis is an ailment resulting from filthy, damp hog lots and insanitary pens and shelters. Germs gain entrance to the body through the tender navel soon after birth. The infection reaches the joints and seems to center in these locations.

Symptoms.—The symptoms noted are disinclination to suckle, constipation, dullness, and lameness. Examination of the navel will reveal the seat of inflammation and sometimes an abscess. The joints are found to be hot, tender, and swollen. Weakness and emaciation follow and the affected pigs usually die from septic absorption.

Treatment.—While infectious arthritis is not seen as frequently in pigs as in calves and foals, it is, nevertheless, a good precaution to examine young pigs very closely for a few days following birth, or until the navel cord has dried and fallen off. If inflammation is noted the navel should be washed with warm water to which a small amount of cresol has been added, and then a dry dusting powder of starch or alum applied. Each pig should be given a physic of Epsom salt and kept in a dry, warm place. If Epsom salt is not available, a dose of raw linseed oil may be given.

ANTHRAX.

Anthrax is an infectious disease of domestic animals which attacks cattle and sheep particularly. Hogs are less susceptible to anthrax, though in a few cases they have been known to contract the disease.

Cause.—Anthrax is caused by a specific microscopic organism known as the anthrax bacillus. This organism lives in damp soil, and fields containing stagnant pools in which the disease has existed may be the source of infection.

Symptoms.—The symptoms of anthrax appear suddenly and quite often the animals are found dead before anything wrong has been observed. When the disease is noted in the living animal there is a high temperature, a complete loss of appetite, chills, and muscular tremblings. The breathing is labored. Blood escapes from the vessels, and the throat becomes swollen and filled with bloody froth.

Red blotches may be seen under the skin as well as in the internal organs after death.

Treatment.—A vaccine is now available and generally used as an immunizing agent against anthrax, and in some instances it has been used as a curative with some degree of success. The organism of anthrax is very hard to destroy by the usual means of disinfection and the burning of carcasses of animals that die of the disease is very important. It is equally as important that the quarters to which the sick ones have had access be thoroughly disinfected. Anthrax is transmissible to man and extreme care should be exercised when handling diseased carcasses. Outbreaks of the disease should be reported promptly to the proper State authorities and their advice followed in the suppression of the malady.

LESSER DISEASES, AILMENTS, AND CONDITIONS.

ABORTION.

Abortion is the expulsion of the developing embryo from the uterus before the end of the gestation period.

Cause.—Abortion may be brought about through exposure to severe cold weather, injuries, crowding, or rough handling. It may occur as a result of poisoning and as a sequel of and in the course of an infectious disease. Infectious abortion is caused by a specific organism which invades the genital organs. This type of the disease is discussed in Farmers' Bulletin 790, Contagious Abortion of Cattle.

Symptoms.—The symptoms of pending abortion vary according to the period the animal has been pregnant. In the advanced stage of gestation the sow in which abortion is threatened goes off feed, is restless, shivers, has muscular tremblings, and at times may experience labor pains. Bleeding from the genitals may occur; although this is not a constant symptom. After a time the delivery of dead pigs will come about. It is quite common in aborting sows to have a discharge from the uterus resulting from infection.

Treatment.—Proper care of pregnant sows will do much to eliminate the danger of abortion. Pregnant animals should be protected from injuries and exposure to bad weather. They should have plenty of exercise and not be placed in crowded pens or shelters. Feeding has much to do with the general health of the pregnant sow, which in turn has a decided influence on gestation. When signs of abortion are noted the sow should at once be taken away from the rest of the herd and placed in a clean, comfortable shelter, preferably a box stall. If the pigs are dead and can not be expelled in the natural way they should be removed with instruments, care being taken also to remove all of the afterbirth from the uterus. The parts should be washed out with a warm normal salt solution. The diet should consist of soft liquid rations, such as mash, milk, and clean slops. A dose of calomel may be given to keep the liver active. If there is a discharge from the uterus of the aborting sow, douching with permanganate of potash, 1 ounce to the gallon of water, or a 2 per cent solution of lysol, repeated once a day, usually proves very beneficial. It is always well to consult a veterinarian.

CHOKE (Obstruction of the Gullet).

Cause.—Obstruction of the gullet in hogs is commonly caused by the animal attempting to swallow a piece of potato, apple, turnip, or other hard feed before it is sufficiently chewed. In some cases the obstruction may be partial and allow the passage of liquid but not solid feed, while in others there is a complete obstruction.

Symptoms.—A choke is easily recognized by the fact of its sudden appearance. The hog suddenly stops eating, stands with outstretched head and neck, nose held close to the ground, mouth open, and saliva flowing freely. If the obstruction is complete a considerable amount of fluid may find its way into the air passages and occasion coughing spells. The animal gasps and sometimes makes efforts to vomit.

Treatment.—Examination does not reveal the location of the object so readily in the hog as in the cow or the horse, owing to the large amount of fatty tissue around the throat. The condition is more difficult to treat in the hog than in other animals. It is rather dangerous to drench a hog, and to use a probang is equally so, unless one has a thorough knowledge of the back of the mouth opening into the esophagus (gullet). If the choke is in the upper portion of the gullet, the material may be reached and removed with the fingers or with long forceps or pinchers. If located lower, the administration of oil may be attempted and prove successful, as it may work around the mass and soften it sufficiently to permit it to be swallowed, or having lubricated the esophagus, it may assist in the expulsion of the object in the act of coughing or vomiting. The condition is serious enough to require trained service.

DIARRHEA IN PIGS (Scours).

"Scours" is a very serious ailment of pigs which takes a heavy toll each year from the new litters. In many of the swine-raising States of the Middle West, where as a rule spring is a rainy and backward season, scours is rated next to hog cholera in the destruction of pigs, and causes severe losses to the industry.

Causes.—Scours is a condition resulting from improper care of both the sow and the litter, and may appear in pigs at an age varying from one day to several weeks. When the disease attacks a pig a day or two old it is evident that some element of faulty nutrition in the mother is a responsible factor. Where the pigs are kept in damp, insanitary quarters, deprived of sunshine and exercise, or allowed to be out and exposed to cold, rainy weather and become chilled, it is no wonder the litter becomes a victim of diarrhea.

Symptoms.—The chief symptom, of course, is the profuse diarrhea. The discharge from the bowels is of a thin fluidlike character grayish-yellow in color, and of a very foul odor. At first the appetite is not badly impaired, but in a few days the pigs affected stop eating or nursing and they soon begin to lose strength and flesh. The coat becomes rough and scurfy and the little pig squeals with pain when handled.

Treatment.—If the scours sets in when the pig is but a few days old the ailment is nearly always fatal. Proper attention should be given to the feeding of the sow both before and after parturition, so that nothing of an irritating nature is transmitted through the

milk to the offspring. The nursing sow should be kept in a clean, warm, comfortable pen or shelter where with her litter she will have plenty of room, air, and sunshine. The pigs should receive each a dose of Epsom salt as a physic to clean out whatever irritating substance there is in the bowels. If the diarrhea persists the physic may be followed with half-dram doses of subnitrate of bismuth. In the absence of Epsom salt raw linseed oil may be substituted.

GASTROENTERITIS (Inflammation of the Stomach and Bowels).

Inflammation of the stomach and bowels is discussed under one heading, as in nearly all cases the condition involves both of these digestive organs.

Cause.—As a rule, gastroenteritis is the result of improper feeding. It may result from the action of irritating substances, such as lye, washing compounds, and sometimes glass, in garbage. Drinking of brine or eating too much salt, as well as many forms of poisoning, may bring about the condition. Excessive or prolonged feeding on a certain diet, such as green corn, frozen forage or silage, moldy feed, or drinking cold water while in a highly heated state—any of these factors may induce gastroenteritis.

Symptoms.—Gastroenteritis is more common in growing pigs and shotes than in older hogs, and the symptoms may easily be confused with those of hog cholera. Owing to the severe pain, the animals stand with arched backs and tucked-up flanks. There is suppression of appetite. Particularly in pigs, there is a thin, fluid-like diarrhea. If pressure is applied to the belly the animals show evidence of pain. There is a slight rise of temperature, accompanied with thirst. As the ailment continues there is pronounced weakness and a staggering gait.

Treatment.—If proper care and attention are given to feeding, the extent of gastroenteritis in hogs will greatly diminish. First of all the diet must be corrected, and whatever irritating substance there is in the digestive tract must be eliminated. A dose of Epsom salt, or of raw linseed oil, varying from 1 to 6 ounces according to the size of the animal, should be given. Avoid heavy feeding for several days, giving thin bran mashes, barley gruel, and milk. The animals should be brought back to the normal ration gradually. If the diarrhea persists, intestinal antiseptics are indicated, such as the sulphocarbolates. Give a plentiful supply of clean drinking water.

ICTERUS (Jaundice).

Cause.—Icterus, or jaundice, is an abnormal condition due to some obstruction of the bile ducts in the liver, and instead of the bile flowing into the intestines normally, it is absorbed through the blood circulation.

Symptoms.—There is general depression, impaired appetite, and sometimes efforts at vomiting. The visible mucous membranes, particularly of the eyes, as well as the white portion of those organs, are of a yellow color. On autopsy the fatty tissue of the body will also be found discolored in the same way.

Treatment.—Since the condition usually arises from a digestive disorder or heavy infestation of internal parasites migrating into

the bile ducts of the liver, attempts should be made to correct the diet and to rid the animals of worms. A physic of Epsom salt should be given and the animals placed on a sloppy bran-mash ration for a few days. If the condition does not clear up in a short time a second physic should be given along with 3 to 15 grains of calomel, according to the size of the hog. Keep the animal in dry, comfortable quarters and give plenty of pure drinking water. To rid hogs of worms see directions on page 23.

MAMMITIS (Inflammation of the Mammary Glands, Garget).

Cause.—Mammitis, or garget, is of common occurrence in the sow, owing to the conformation of the animal which allows the udder to hang close to the ground, thus subjecting it to frequent bruises. Under such conditions infection finds its way easily into the tissues through abrasions, sometimes reaching the inner substance of the glands through the opening in the teats. There is a resulting inflammation, painful swellings, and oftentimes numerous abscesses.

Symptoms.—The symptoms of mammitis are easily recognized by the swollen mammary glands (udder) which are hard and hot to the touch. There is a loss of appetite, and fever and constipation are noted. The sow will often refuse to let the pigs suckle on account of intense pain.

Treatment.—Nursing sows should be kept in clean lots or pastures, where the chances of injury to the udder are lessened. They should be closely observed frequently, and if sore teats are noted immediate attention should be given before the condition becomes serious. If there are signs of inflammation, a dose of Epsom salt is desirable. If there are open sores the affected parts should be cleaned and washed with warm water in which alum has been dissolved. After thorough cleaning, a mixture of 15 parts of glycerin and 1 part of carbolio acid should be applied to the sores. If abscesses of the glands are noted, they should be opened with a clean, sharp knife, drained freely, and a 50 per cent solution of iodine injected into the openings or pockets. Hot applications may be used on the glands (udder) to reduce inflammation and swelling.

METRITIS (Inflammation of the Uterus).

Cause.—Metritis (sometimes called pig-bed fever) may follow either a normal delivery or a case of abortion. Most commonly it follows cases of difficult parturition, where assistance has been given in delivering the pigs. In such instances it often happens that no precautions are taken to prevent the introduction of infection. The instruments used and the hands of the person may be dirty and so be the means of contamination. Sometimes a dead pig or a portion of the afterbirth may be retained in the uterus and cause the inflammation.

Symptoms.—The symptoms are those of chills (shivering), dullness, restlessness, temperature often up to 105° F., and loss of appetite. Sometimes the animal staggers when moving about. The genitals are inflamed and hot to the touch, and if dead pigs are retained there will be frequent efforts made to expel them. There is a foul-smelling discharge from the vagina.

Treatment.—Metritis results in serious losses each year from the fact that it affects the most valuable portion of the herd, the breeding females, and is a condition demanding more attention. When difficult parturition makes it necessary to give assistance in the delivery of pigs care should be taken that the instruments and hands are thoroughly clean before starting in on the case. Great care must be exercised to avoid injury to the organs and to the passages of the region. The uterus should be thoroughly emptied and washed out with a warm salt solution, or a 2 per cent solution of lysol. A solution of permanganate of potash, 1 ounce to the gallon of water, may be used. Cases of this character should have the attention of a veterinarian.

NECROTIC ENTERITIS (Necrobacillosis).

Necrotic enteritis is a chronic inflammation of the intestines which impairs the digestion to a serious degree, stunts the growth of the animal, and often proves fatal.

Cause.—From the fact that *Actinomyces necrophorus* is found in practically all cases of necrotic enteritis, the name necrobacillosis is often applied to the ailment. However, it is not fully known to what extent this organism plays a part in the development of the disease.

Symptoms.—Necrotic enteritis is usually confined to pigs and shotes, rarely affecting the older hogs in the herd, and may show in a number of young animals at the same time. In the early stage the appetite is not badly impaired, but as a rule there is a profuse diarrhea. As the disease progresses the pigs eat sparingly, become pot-bellied, unthrifty, thin, and weak. The skin is dry and scurfy. While these symptoms are somewhat like those of hog cholera, the absence of fever and the fact that no red spots appear in the usual locations on the skin differentiate the ailment from cholera.

Autopsy.—Necrotic enteritis, or necrobacillosis, can easily be recognized by examination of the intestines of a pig that has died from the disease. Small, white, circumscribed necrotic areas may be seen through the outer covering of the large and small intestines. On splitting open the small intestines the inner lining will be found thickened and studded with dead patches ready to slough. These patches contain a mealy or cheesy substance, and in advanced stages the whole membrane can easily be scraped off. The lesions, however, are not elevated and are not confined to a particular section or location, as in hog cholera.

Treatment.—To be effective, treatment should be applied before the disease has progressed. Rough feed and so-called stock food and tonics that may contain irritating ingredients should be avoided. Put the animals affected in pasture if such is available. A physic of some kind, such as Epsom or Glauber salt, or linseed oil, is recommended. The following mixture has been used and found of some benefit as a treatment:

Copper sulphate.....	1 part.
Hyposulphite of soda.....	4 parts.
Charcoal.....	2 parts.
Common salt.....	6 parts.

Give one heaping teaspoonful of this mixture to every 100 pounds of live weight, in slop or milk, night and morning for about a week.

Care should be taken that the copper sulphate is well pulverized and thoroughly mixed with the other ingredients.

The pulverized copper sulphate alone may be added to the drinking water in proportion of 1 ounce to 25 gallons of water.

NECROTIC RHINITIS (Necrobacillosis, Bullnose, Sniffles).

Necrotic rhinitis is a condition affecting growing pigs principally, and is characterized by an overgrowth of tissues in the region of the face, nose, and mouth, and by a sloughing of certain of these tissues. Necrotic lesions may also occur on other parts of the body.



FIG. 3.—Necrotic ulcer (necrobacillosis).

Cause.—Necrotic rhinitis, commonly called necrobacillosis, results from the invasion of the *Actinomyces necrophorus* into wounds or abrasions on the head or other parts of the body, caused by blows with sharp sticks, fighting, and injuring the tissues with the teeth, and laceration of the gums and lips with rough feed or with pieces of bones or wire.

Symptoms and lesions.—Perhaps the first symptom noted is that of impaired appetite. There is repeated sneezing, hence the term "sniffles." A bloody material is often expelled from the nose in the act of sneezing. Well-defined lumps or

swellings occur on some part of the head or face, usually on the snout (bullnose). When cut open these swellings are found to contain a cheeselike pus or substance having a disagreeable odor. The lesions extend to and destroy the bones of the face, causing the pigs to assume a "dish-face" appearance.

Treatment.—In this form of necrobacillosis, or necrosis, treatment should be applied in the early stage in order to be effective. When the swellings are noted before they are large they should be incised and all the pus removed, if possible. Then introduce in the openings made a mixture of 15 parts of glycerin and 1 part of carbolic acid or a 50 per cent solution of iodine. After the swellings have become extensive or sloughing of the tissues has set in, treatment is of little avail and destruction of the pig is recommended.

OVERHEATING (Sunstroke—Heat Stroke).

Cause.—Overheating, either as a result of exposure to sun or of extreme exertion, is a common occurrence in swine; in fact, the nature and conformation of that class of animals make them quite susceptible to such a condition. It may easily be mistaken for epilepsy, "blind staggers," or fits if the facts and circumstances in the case are not considered. However, the related factors, such as extremely hot weather, lack of shade, overcrowding, or prolonged chasing of the animals ought to make clear the nature of the ailment.

Symptoms.—Hogs will show signs of overheating rather suddenly. The animals will apparently gasp for breath, grow restless for a few minutes, wobble in their walk, and finally fall over on their sides, going into convulsions. The body temperature is extremely high, in some cases having been known to rise above 110° F. Hogs in overheated condition need prompt attention if they are to be saved from death.

Treatment.—Carelessness on the part of some one, of course, is responsible for the overheating of hogs, for the animals will not remain in the hot rays of the sun or exercise unduly in extremely hot weather unless they are compelled to do so. Swine should be provided with plenty of shade both in the hog lot and in the pasture. In shady fields hogs will do quite well without a wallow hole, but in open pastures with no trees or other protection from the sun, a concrete wallow is almost a necessity. The water in such wallows should be changed often and the bottom and sides cleaned and disinfected at least every two weeks. When an animal shows signs of heat prostration cold water should be poured on the head, but not over the entire body. This should be kept up until the animal shows signs of reviving. Aromatic spirits of ammonia in teaspoonful doses for 100-pound hogs as a diffused stimulant and sweet spirit of niter in half-ounce doses to cool the body temperature are beneficial.

PARALYSIS OF HIND QUARTERS.

Paralysis of the hind quarters in swine is quite common and is attracting considerable attention, since in the majority of cases the cause is obscure and attempted treatment fails to bring relief. Various theories as to the origin of this condition are given, all of which may play a part, but any one of which would be hard to establish in a given case.

Cause.—Paralysis may be brought about by injury in handling, shipping, or breeding. Any lesions that may affect the spinal cord, such as tumors, abscesses, diseased vertebrae, tuberculosis, or parasites, may produce paralysis. A lack of mineral matter in the feed of the growing pig may affect the structure of the bones and cause paralysis of the hind quarters in later life. On rare occasions kidney worms migrating into the muscles of the loin region have been credited with causing posterior paralysis. The paralysis sometimes follows parturition, particularly if the sow is in a run-down condition and is being nursed heavily. Penning up in a small inclosure without exercise for an extended period may cause paralysis. Lumbago and rheumatism also are said to be contributing causes.

Symptoms.—As a rule, paralysis of the hind quarters comes on gradually. The first indication often is a wobbly, unsteady gait, a sort of incoordination of the hind feet. In turning, the animal will move the fore part of the body half around before any attempt is made to move the hind quarters. Walking becomes more and more difficult, weakness of the hind quarters becomes more pronounced, and finally the animal can no longer stand and drags those parts when forced to move about. For a few days there is very little disturbance of the appetite and other functions, but if the condition can not be remedied constipation, loss of appetite, and consequent wasting follow.

Treatment.—Regardless of the cause, the first step in the treatment of posterior paralysis is to make the animal as comfortable as possible. If there is constipation a physic of Epsom salt or linseed oil should be given. Feed a light diet, such as slop made of bran and milk. Keep bedding clean and furnish plenty of pure drinking water. If the sow is suckling a large litter the pigs should be weaned. Massaging of the affected muscles and the application of an irritating liniment are sometimes beneficial. Equal parts of turpentine, ammonia, and linseed oil, mixed, have been used as a liniment with good results. A ration of crushed wheat, bran, and milk, made into a slop, will do much toward restoring the depleted vitality in a sow caused by heavy nursing.

PLEURISY.

Pleurisy is closely allied to pneumonia and is an inflammation of the serous membrane covering the lungs and the inner walls of the thoracic cavity (chest).

Cause.—Like pneumonia, pleurisy is brought about by a number of causes, such as drafty shelters, exposure to cold and wet weather, or injuries by kicks.

Symptoms.—The chief symptoms noted are chills (shivering), rapid breathing, disinclination to move, and loss of appetite. The gait is stilty, the animal affected sometimes showing a marked lameness in the forelegs. Pressure on the chest walls often causes the sick hog to squeal with pain. There is a marked elevation of temperature. The acute form of the disease runs a course of a week or two, but if it becomes chronic it is likely to last several weeks. The quick breathing without apparent movement of the chest muscles, the absence of red spots on the belly and hams, and the fact that the disease does not spread rapidly to the rest of the herd serve to differentiate pleurisy from hog cholera.

Treatment.—As in pneumonia, the treatment for pleurisy should be one of prevention, such as providing warm, comfortable quarters in severe weather, away from drafts, wet floors, and bedding. The same conditions that are conducive to pneumonia are often responsible for pleurisy, particularly the nesting of hogs closely under straw stacks in winter and their coming out into a cold wind for feed and water. The disease is a difficult one to recognize and to treat; therefore no time should be lost in calling in trained assistance, in order that early and proper attention may be given and the loss of animals avoided. Make the hog as comfortable as possible. Apply hot

blankets to the chest walls, and give a physic of Epsom salt. A small amount of nitrate of potash, about a half an ounce to the gallon, in the drinking water is beneficial.

PNEUMONIA.

Pneumonia is an inflammation of the lung tissue in which there occurs an excessive outflow of secretion that at times causes clogging up of the air passages.

Cause.—Pneumonia may be induced by a number of causes, such as exposure to severe weather, inhalation of irritating substances, drenching, feeding in dusty lots, lung worms, injury, etc.

Symptoms.—At certain stages of pneumonia hogs or pigs affected act a great deal as if they had hog cholera. There is loss of appetite, disinclination to move about, fast breathing, and increased temperature. These symptoms are shown regardless of the source or cause from which the disease has developed. However, there is much to distinguish pneumonia from hog cholera. Not so many of the animals are sick at one time and the disease does not, as a rule, spread to the entire herd. The temperature of the sick hogs will rarely exceed 104° F., while in hog cholera it may run as high as 107° F. The congested condition of the visible mucous membranes is absent. There are no red spots on the skin covering the inner sides of the hams and on the skin of the belly. Hogs suffering with pneumonia have a tendency to lie on their breasts to get the cooling effect of the ground against the affected parts. Death, as a rule, does not occur so quickly as in hog cholera, recovery is more rapid and complete, and fewer animals succumb.

Autopsy.—Examination of a hog dead from pneumonia will reveal the fact that the lesions are confined principally to the lungs. These organs will be found highly congested and sometimes filled with pus or a puslike substance. At certain stages of pneumonia portions of the lungs assume the appearance of liver, or sections of them will be found in a degenerated (decayed) condition. Signs of cholera in the various organs are absent.

Treatment.—Pneumonia may be prevented by keeping the hogs comfortably sheltered in severe weather, giving them at the same time plenty of ventilation. Burrows in straw stacks are conducive to pneumonia in hogs in winter, as the animals congregate in these hot, unventilated nests and come out to eat or drink usually steaming with heat. In this condition a sudden contact with a cold wind will chill them and often cause them to contract the disease. Hogs should be fed on concrete floors or platforms instead of in mud or dust. (Figs. 4 and 5.) Cleanliness in feeding will do much toward preventing infestation with worms, one type of which migrates from the intestines through the lungs of swine and may cause pneumonia.

The sick hog should be kept in a clean, warm box stall, if possible, where plenty of good air and sunshine are available. Administer a purgative, such as Epsom salt. If the animal will eat, feed bran mash and other soft and sloppy feed. In severe cases where there is danger of heart failure, 5 to 15 drops of tincture of digitalis may be given every three hours, according to the size of the animal.



FIG. 4.—A good meal improperly served. This method of feeding shelled corn makes it a mixture of grain and filth.

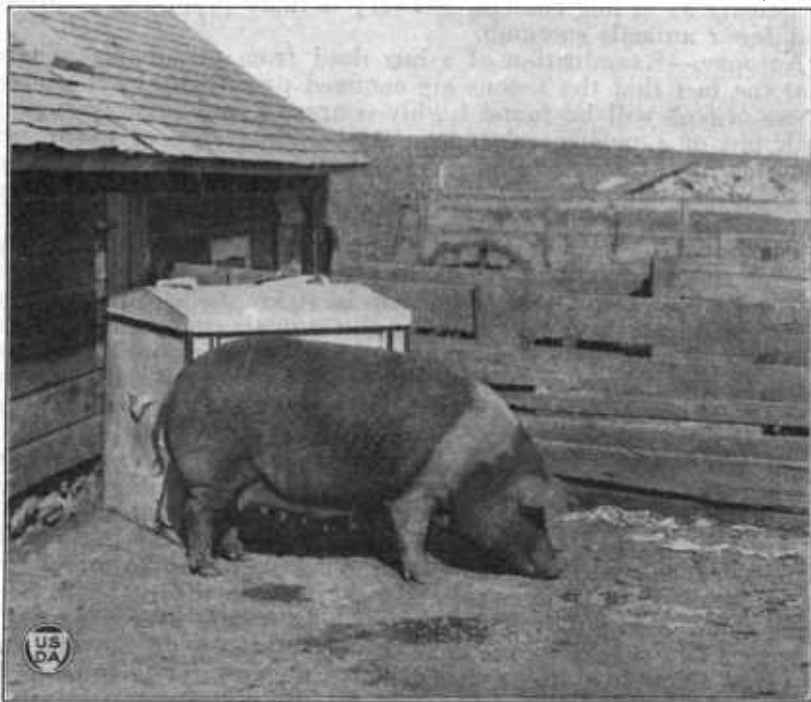


FIG. 5.— A good meal properly served. Corn fed on a clean concrete floor.

POISONING.

Poisoning in swine is quite a common occurrence. There are several forms in which the symptoms resemble those of hog cholera, but practically all cases of poisoning are devoid of fever, which eliminates the diagnosis of hog cholera.

Causes.—Hogs may be poisoned by feeding on spoiled feed, frosted alfalfa, an excessive diet of cottonseed meal, or by poisonous plants. Poisoning may also occur from feeding garbage containing such compounds as lye, other caustics, and irritating substances. Cocklebur poisoning is of more or less frequent occurrence. Sometimes hogs are poisoned by eating too much salt, and frequently through drinking meat brine, of which the animals are fond. In sections where



FIG. 6.—Examining a hog carcass for indications of poisoning and disease. After such examination, hands and instruments should be washed and disinfected and the carcass burned.

the deadly nightshade grows there is more or less poisoning from that plant. Carelessness in the handling of disinfectants in the hog lots, such as carbolic acid, bichlorid of mercury, cresol compound, etc., may result in poisoning the hogs.

Symptoms.—The symptoms shown in these various forms of poisoning are more or less similar in character. Salt poisoning creates an intense thirst, restlessness, suppression of appetite, vomiting, colicky pains, diarrhea, frequent urination, muscular weakness, and sometimes paralysis. These symptoms, with the exception of frequent urination, apply fairly well in cases of lye, mercury, and cocklebur poisoning. Cottonseed-meal poisoning produces irregular or suppressed appetite, thumps, unthriftiness, weakness, unsteady gait, and, in severe cases, blindness. The deadly nightshade produces nausea, vomiting, increased respiration, excitement, and con-

vulsions. Unless the source of the trouble is known, it is very difficult for the layman to distinguish between the various forms of poisoning.

Lesions.—The changes in the bodies of hogs dead of poison vary with the nature of the poisonous material taken. In cases of salt poisoning there will be found intense inflammation of the lining of the stomach and sometimes a quantity of blood free in the stomach and bowels. Caustics will also produce inflammation of the stomach and intestines, with erosions of the mucous membranes in various places. Cocklebur poisoning causes similar inflammation of the lining of the stomach and intestines, with sloughing patches of the membrane in the intestines. Not many changes are noticeable in cases of nightshade poisoning, except a distension of the bladder owing to the retention of urine, and the blood is usually darker than under normal conditions. Cottonseed-meal poisoning produces inflammation of the digestive organs and congestion of the lungs. Fluid is found in the thoracic and the abdominal cavities, and the fatty tissues have a yellow cast.

Treatment.—Medical treatment for any form of poisoning is of little value except when the cause is known and the condition is detected in the early stages. As soon as the cause of the trouble is determined it should be removed or the animals turned out to pasture land that is free of poisonous plants or forage, if such is available. Administration of emetics to those hogs that are not too sick is in order, followed by purgatives. The hogs should have access to a plentiful supply of clean drinking water, and should be kept off heavy feed for a number of days.

RACHITIS (Rickets).

Rickets is a disease or condition impairing or interfering with the development of the bony structures in young animals, the ailment being quite common in pigs.

Cause.—Rickets usually has its origin in a diet deficient in bone-forming salts or other elements. The ailment is likely to begin about weaning time, when the pigs are placed on solid feed that is not well balanced in nutritive elements.

Symptoms.—As a rule, the first symptoms noted are those of digestive disturbance, such as loss of appetite, bloating (pot-bellied), and weakness. On close observation deformity in the bones of the legs will be seen. Severe pains develop in the muscles, bones, and joints of locomotion, and the pigs walk with a "stilty", lame gait. These symptoms are followed by enlargement of the bones of the legs, especially at the joints, and the long bones become quite bowed. Finally, there is a loss of weight and the pigs affected become runts of the worst type.

Treatment.—The development of rickets may be avoided by proper attention to the feeding of pigs after weaning time. Properly balanced rations, with salt and charcoal available, will insure the bone-building properties formerly provided in the milk of the mother. A good field of alfalfa is a good place for growing pigs. The alfalfa may be supplemented with a little bone meal. The pigs should have plenty of room for exercise, plenty of sunshine and pure drinking water, with clean, warm sleeping quarters. If necessary the bowels should be kept active with doses of Epsom salt. These precautions

will effect a recovery in a large percentage of the pigs already affected if taken in the early stage. Deformed, runty pigs seldom make satisfactory gains.

RHEUMATISM.

Rheumatism in swine may be of two types, muscular and articular, though the muscular type is the more common.

Cause.—Although rheumatism may be caused by absorption of toxic material, the ailment is the result mostly of exposure to cold, wet weather. Among hogs that are shipped a long distance in winter many of the animals later become subject to rheumatism, although the condition may not be recognized as such, or may be entirely overlooked.

Symptoms.—In either type of rheumatism the first symptoms noted are those of difficult locomotion. The animals move in a slow, painful way. In the articular type the joints become swollen and sensitive to the touch. There is lameness and if more than one leg is affected the hogs are disinclined to walk. The appetite is impaired. Many cases of posterior paralysis are probably the result of muscular rheumatism.

Treatment.—Treatment for rheumatism is of little avail. The animals should be kept comfortably housed and away from cold drafts. They should be fed a laxative diet and made to exercise as much as possible under favorable weather conditions.

SKIN DISEASES.

Considering the filthy conditions of living to which hogs are commonly subjected, skin diseases are not so prevalent as might be expected. The chief disorders of the skin in swine are eczema, or "soot," of pigs, sometimes known as "pitch mange" or "pitch scabs"; erythema, which is a simple reddening of the skin without inflammation; swine erysipelas or urticaria, commonly called diamond skin disease; and mange (hog itch). Mange is fully discussed in Farmers' Bulletin 1085, Hog Lice and Hog Mange.

Cause.—The common factor responsible for practically all forms of skin diseases in swine is the filthy condition in which the hogs are raised and kept. While skin ailments may result from other causes, such as scalding, frostbites, strong dips, irritating liniments, or may appear as a symptom of an infectious disease, such as hog cholera, in the majority of cases the causes are found in the insanitary hog lot, the filthy wallow, and lousiness. Skin disorders sometimes result from improper feeding, which leads to constipation and the absorption of toxic material. Swine erysipelas results from the invasion of a specific organism and is regarded as infectious.

ECZEMA.

Eczema, while rare among mature hogs, is not uncommon in pigs. It is usually seen as a secondary ailment in pigs left unthrifty as the result of disease, such as chronic cholera, chronic indigestion, rheumatism, rickets, scours, and heavy infestation of lice.

Symptoms and lesions.—Eczema first appears in the form of red elevations of the skin in various parts of the body, accompanied by

severe itching that causes the animals to rub at frequent intervals. On the reddened portions of the skin there appear small blisters filled with a sticky fluid which later turns into pus. When these blisters break a scab is formed. In prolonged or aggravated cases the skin becomes thickened and cracked.

ERYTHEMA.

Symptoms and lesions.—Erythema is characterized by diffused redness of the skin, readily seen in white hogs but often overlooked in red and black ones, in which types the lesions are hard to detect except on close inspection of the lighter parts of the body, such as the belly and the inner aspect of the hams. If pressure is applied to the red areas the color disappears only to return on removal of pressure. In this condition there is but little itching as a rule.

Treatment.—Sanitation in the hog lot is the keynote of treatment in swine diseases of the skin. Sanitation and proper attention to the feeding of the herd will generally remove the annoying causes. The cleaning and disinfecting of hog lots and shelters are important as well as the dipping of the animals to rid them of parasites. The hogs, pigs, and shotes should have access to rubbing posts well supplied with crude oil or other insecticide. If a concrete wallow is part of the equipment on the place, the oil may be poured on the water and the animals in wallowing will get the benefit. The same results may be had by providing a wallow of fine sand saturated with the oil. In those conditions of the skin where itching is a persistent factor, an oil or ointment, such as carbolated vaseline or olive oil, may be used to allay the irritation. A corrective diet, along with a purgative of Epsom salt or linseed oil, will be beneficial.

SWINE ERYSIPELAS.

Swine erysipelas exists to some extent in the United States and is recognized most frequently as the so-called "diamond skin disease."

Cause.—Recent investigations have demonstrated that the particular form of swine erysipelas known as diamond skin disease is caused by a specific germ infection. This germ, *Erysipelothrix porci*, is the same as that which causes acute swine erysipelas. Consequently, diamond skin disease is now considered as being a chronic form of swine erysipelas.

Lesions.—The skin lesions of swine erysipelas usually consist of well-defined, slightly elevated, diamond-shaped areas, of a dark-red color. In more extreme cases the reddened or inflammatory condition of the skin may extend over considerable portion of the body surface. In such cases there may also be more or less necrosis and sloughing of the skin.

Treatment.—Local treatment in this form of skin affection would prove of little value. It is quite probable that many animals so affected recover without treatment.

URTICARIA.

Urticaria, also known as "diamond skin disease," assumes a similar appearance to that of swine erysipelas. From a clinical observation it is not possible to differentiate one ailment from the other.

Cause.—Urticaria may result from various factors causing irritation and subsequent inflammation of the skin. Feeding on buckwheat ration has been known to produce the lesions, and other feeds of a similar nature may bring about the condition through digestive disturbance.

Lesions.—The lesions are practically the same as those of the chronic form of swine erysipelas. See page 20.

Treatment.—A corrective diet and removal of the irritating factors will usually overcome the ailment. A purgative of Epsom salt is in order.

SPASMS AND CONVULSIONS.

Cause.—Spasms and convulsions are usually the symptoms of diseases affecting the brain or nervous centers, although they may be induced occasionally from a disturbed digestion. Chief among such conditions may be mentioned vertigo, also known as blind staggers, and epilepsy (fits).

Symptoms.—Spasms are not so pronounced in blind staggers as in epilepsy. Vertigo, or blind staggers, comes in a sudden spell of dizziness; the animal appears blind, and moves about aimlessly. There is a staggering gait and finally the animal falls on its side. The symptoms may disappear entirely in the course of two or three hours.

Epilepsy is characterized by general restlessness, muscular tremblings, jerking of the head and legs, and prostration. Violent convulsions occur, during which there may be discharge from the natural openings of the body. These attacks may occur in rapid succession.

Treatment.—When either vertigo or epilepsy results from abnormalities or disturbed functions of the brain or nerve centers, there is not much hope of overcoming the conditions. However, since these symptoms may occur from the heavy feeding of material hard to digest, heavy infestation of worms, or acute inflammation of the stomach and bowels, it is well to pay some attention to these factors, and an attempt should be made to remove such causes if they exist. The bowels should be cleaned of irritating matter with a physic of Epsom salt. The animal should be fed a light diet of slops, bran mashes, and the like. If the condition persists, there may be some deep-seated cause which is impossible to remove.

SPASMS OF THE DIAPHRAGM (Thumps).

“Thumps” in swine or other animals is synonymous with hicough in the human, and is due to an overstimulation of the pneumogastric nerve, which in turn causes a spasmodic jerking of the diaphragm (midriff).

Cause.—Thumps is usually brought about through a lack of exercise and also by improper feeding, particularly in young pigs, in which class of animals the ailment is most commonly seen. It may occur as a symptom of digestive diseases, such as gastritis (inflammation of the stomach), enteritis (inflammation of the intestines), or heavy infestation of worms. It is often associated with hog cholera, and with swine plague (hemorrhagic septicemia) it is almost always a constant symptom. Recent investigations have brought out the fact that worm embryos migrating through the lungs of young pigs also cause thumping.

Symptoms.—Thumps is easily recognized and the name implies practically all the symptoms. There is a continued series of spasmodic contractions of the diaphragm which cause the animals to jerk in a peculiar way, the flanks drawing in and the chest walls out at each jerk. At times the pigs are dull and listless, and if the ailment is due to indigestion there is the accompanying constipation and impaired appetite.

Treatment.—If the condition is of dietetic origin and is observed and treated in its early stage, it is not a serious ailment. Should the case be overlooked or neglected, however, it may run for a considerable period with a resulting loss of flesh and with stunting. As a rule, a physic of some kind, either linseed oil or Epsom salt, will correct the trouble. The pigs should be given wide range, light and airy quarters, plenty of sunshine, and for a few days fed a light diet.

STOMATITIS (Sore Mouth).

Stomatitis is an inflammation of the mucous membrane of the mouth and is quite common in swine, although little attention is given to the ailment.

Cause.—Stomatitis may occur from a number of causes, such as injury from rough or frozen forage, stubble, fermented silage, pieces of wood or sharp metal, nails, bones, or bearded grains. It sometimes results from "snubbing" large hogs for ringing, castrating, or immunizing. Irritating chemicals, hot feed, poisonous molds, or germs in filthy wallow holes may also cause the condition.

Symptoms.—As a rule, when stomatitis is noticed in swine it has reached the secondary stage, at which time there is profuse salivation and drooling. The mouth is held open, the membrane is hot to the touch, and the animal refuses hard feed. Thirst is a noticeable factor.

Treatment.—Stomatitis can easily be prevented by proper care in the feed lot. If garbage is fed, a close watch should be kept to see that no injurious ingredients are present in such feed. Feed on clean floors or platforms. Keep the animals away from filthy wallow holes. When hogs show signs of sore mouth they should be examined closely for possible foreign bodies lodged in the inside of the mouth. Give the animals access to clean cold water where they can cool the affected parts. Chlorate of potash added to the drinking water is of much benefit, using it in proportion of three teaspoonfuls to the pail of water. Feed bran, middlings, and milk until the condition has improved.

NECROTIC STOMATITIS (Infectious Sore Mouth).

Cause.—Necrotic stomatitis has been classed as a form of necrobacillosis. It is mostly confined to young pigs and is the result chiefly of keeping the animals in filthy hog lots and their having access to mudholes and accumulation of old manure. The organism of necrosis, *Actinomyces necrophorus*, gains entrance into the tissues of the mouth through abrasions or lacerations. The ailment has been known to spread rapidly in a litter through the suckling of sows with contaminated teats.

Symptoms.—Perhaps the first symptom noted is that the pigs refuse to suckle or eat, acting dull and listless. There may be a slight elevation of temperature. On examining the mouths of the animals there is found a number of inflamed areas or patches on the gums, lips, and hard palate, which later develop into necrotic ulcers. There is a sloughing of the tissues accompanied with a disagreeable odor. The centers of the sloughed patches are white or yellowish white in appearance. The pigs are unable to eat owing to the severe pain and in a short time become weak and emaciated.

Treatment.—Necrotic stomatitis can be easily avoided by following the common rules of sanitation in the hog lot. Pens and lots to which the pigs have access should be kept clean, free of old straw nests and manure piles. At least once or twice a month a coating of slaked lime should be applied to the floors of pens and shelters, as well as in the lot when such space is not too extensive. When the disease makes its appearance the pigs affected should be put by themselves away from the balance of the herd, along with the mother if they are still suckling. Washing of the mouth should be done immediately, using a solution of permanganate of potash in the proportion of 1 ounce of the permanganate to 1 gallon of water. If the sloughing is not too extensive and the value of the pigs justifies it, each ulcer may be rubbed with a stick of caustic potash or silver nitrate, repeating this treatment once a day for a week. When the lesions are extensive and the pigs stunted in growth it is a waste of time to attempt treatment and such animals should be destroyed.

Because of the resemblance of necrotic stomatitis to foot-and-mouth disease it is important to report all such cases to the proper authorities for prompt investigation.

WORMS.

Severe infestation with worms will cause symptoms in pigs somewhat similar to those of hog cholera. While hogs are seldom free from worms, the older hogs are not, as a rule, disturbed to any great extent by their presence.

Symptoms.—In pigs, worms cause a general digestive disorder resulting in unthriftiness, weakness, and emaciation. Worms that infest the lungs cause an irritation in those organs which commonly results in a bronchitis, characterized by a husky cough, and which may develop into pneumonia. Even if pneumonia does not result, the worms are more or less detrimental to the growth of the animals. When the worms infest the intestines there is an impairment of the general health. These parasites, which sometimes attain a length of 10 inches or more, cause an irritation of that part of the alimentary tract resulting in digestive disturbances which give rise to diarrhea or constipation. They interfere materially with the absorption of food and the pigs become pot-bellied, have rough coats, and show signs of general unthriftiness. The absence of fever and the fact that only the pigs in the herd are involved serve to distinguish the condition from cholera.

Treatment.—Sanitary hog lots, well drained, and treated with a coat of slaked lime at frequent intervals, will do much toward preventing worm infestation. It is especially important to protect

young pigs from worms, and the system known as the McLean County system of swine sanitation has been found very effective in protecting pigs against worms, bullnose, cholera, and other diseases. It consists in putting clean sows in clean farrowing pens, moving the sow and pigs to clean pasture, and keeping them there until the pigs are four months old or more. There are various methods of treatment to rid swine of worms. Chenopodium (wormseed oil) may be given in doses of one drop of oil for each 2 pounds of live weight, mixed with about 2 ounces of castor oil for each animal. For example, a 30-pound pig should receive 15 drops of wormseed oil and 2 ounces of castor oil. Animals weighing over 100 pounds should be given 3 to 4 ounces of castor oil. Keep the pigs off feed overnight before treatment. Santonin is a reliable vermifuge if used in repeated doses, but is rather expensive. It is given in the following mixture and the amount indicated is for a 50-pound pig: Santonin $2\frac{1}{2}$ grains, calomel $\frac{1}{2}$ grain, freshly ground areca nut 1 dram, sodium



FIG. 7.—Properly cleaned and disinfected hogpens and shelter.

bicarbonate $\frac{1}{2}$ dram. This may be given in a light feed of slop, but the efficacy of the drug is impaired if mixed with feed. Since santonin is most effective when given in repeated doses, and since swine are difficult to handle and dose, the chenopodium treatment is more satisfactory, and experiments show that it is more effective.

THE PREVENTION OF DISEASES.

In all diseases, ailments, and abnormal conditions of swine, the sane, simple, and effective method to adopt is one of prevention. While only a few individuals in a herd may be sick or unthrifty at one time, the fact should not be overlooked that under common conditions on the average farm the entire herd is exposed to parasites, inclement weather, and injury, as well as being subjected to improper methods of feeding.

Practically all the diseases and ailments discussed, particularly those of a noninfectious nature, can be prevented by proper care in

feeding and housing. Most of the infectious diseases touched upon may be avoided through sanitation (Fig. 7), quarantine, and immunization. Pigs, shotes, and old hogs should not be allowed to feed from the ground. Suitable feeding floors or platforms, preferably of concrete, and troughs of some nonabsorbent material that can be cleaned, washed, and disinfected frequently, are recommended. Some sort of automatic drinking fountain which does not overflow should be provided (Fig. 8). If a wallow hole is deemed necessary, that also should be of concrete, so that it may be cleaned and disinfected from time to time.

Frequent cleaning of pens, sheds, shelters, and hog lots, as well as troughs and feeding floors, is an important factor in disease prevention. Disinfection of premises should follow outbreaks of infectious diseases. In addition to thorough cleaning at stated intervals, a liberal amount of slaked lime should be applied in pens, houses, and adjoining lots. These precautions and the sanitary equipment suggested, while meaning a little

added expense in the raising of hogs, will pay for themselves in a short time from the saving of feed and the protection of the animals' health. When disease appears in the herd no time should be lost in calling a veterinarian so that a correct diagnosis may be made and proper treatment administered.



FIG. 8.—Sanitary drinking fountain.

LOSSES IN SHIPPING SWINE.

As a supplement to this discussion of swine diseases it seems advisable to touch upon the losses sustained each year by swine growers and farmers in the shipment of hogs to market. The number of dead and crippled animals found on arrival at stockyards is an item worthy of consideration as a factor bearing on the amount of marketable pork to say nothing of the consequent effect in decreasing the farmer's profit on the entire shipment.

During a period of six months in 1922 there was received at 9 of the principal stockyards of the country a total of 28,375 dead hogs and 38,708 in a more or less crippled condition, according to reports obtained through the Federal meat inspection service. These figures indicate clearly a waste that is largely unnecessary, most of

which can be attributed to carelessness on the part of those handling the animals at points of origin of shipments.

Aside from wrecks, and extreme weather conditions, there seems to be no logical reason for so many hogs dying between points of origin and destination. Much fault in this respect is attributed to improper handling of swine just prior to shipment. Quite often hogs about to be shipped are rushed to some small inclosure, penned up in a crowded way, and fed a heavy ration preparatory to being hauled or driven to the stock car. In getting them to the loading point, frequently the animals are prodded, kicked, and hurried until worried into a highly nervous condition. Such hogs are often loaded in cars containing sharp pieces of broken timber, nails sticking out of boards, and in which the flooring is covered with mud and rubbish, no precaution being taken to remedy these dangerous conditions. Often no bedding of any kind is provided. Under such circumstances many of the animals reach the yards badly crippled, the injuries commonly involving the hind quarters, resulting in lowered quality of the most valuable cuts—the hams.

When ready for market, hogs should be assembled a sufficient length of time prior to the date of shipment to allow them to become rested. They should not be crowded into small pens or houses nor fed heavy rations. If they are driven to the loading point they should not be rushed on the way; if they are hauled, too many hogs should not be crowded into the truck or wagon. The loading chutes should not be too steep, should be made secure, and have the sides protected so that the animals will not fall off. Crowding too many hogs in a car, particularly in hot weather, is likely to result in a number of them dying in transit. Loading hogs after a heavy feed is injurious to them. A little hunger is far better for them on the journey than indigestion. There is nothing to be gained in added weight of the animals by forced feeding just before shipping. The aim should be to get as many of the hogs as possible to the stockyards in good condition.

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